Maximum CI 30 Series

Professional Digital Decoder

User Manual

Software Version≥ 03.d9.29

2009/08/06

MAXIMUM®
digital technology

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1. Before Using the Device

Thank you for purchasing the Maximum CI 30xx series.
This User Manual is written for operators/users of the Maximum CI 30xx Professional Digital Decoder to assist in installation and operation. Please read this user manual carefully before you proceed to install and use the device

For Your Safety

This equipment is provided with a protective earthing ground incorporated in the power cord. The main plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor, inside or outside the device, is likely to cause device malfunction and endanger the users.

Do not remove the covers of this equipment. Hazardous high voltages are present within this equipment and may be exposed if the covers are removed. Only KJAERULFF1 DIGITAL A/S trained and approved service engineers are permitted to service this equipment.

No operator serviceable parts inside. Refer servicing to KJAERULFF1 DIGITAL A/S trained and approved service engineers.

For the correct and safe use of the device, it is essential that both operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

Whenever it is likely that safety protection is impaired, the device must be made in-operative and secured against unintended operation. The appropriate servicing authority must be informed. For example, safety is likely to be impaired if the device fails to perform the intended measurements or shows visible damage.

WARNINGS

- The mounting environment should be relatively dust free and free of excessive vibration. The ambient temperature should be between 0 ℃ to 40 ℃, and the relative humidity is recommended to be between 20% to 80% (no condensation occurs).
- Avoid direct contact with water.
- Never place the equipment under direct sunlight exposure.
- The outside of the equipment may be cleaned using a lightly dampened cloth. Do not use any cleaning liquids containing alcohol, methylated spirit or ammonia etc.
- For continued protection against fire hazard, replace line fused only with the same type.
- Air intake for cooling is achieved via holes at the side of the device and the fans inside. In order to prevent air flow obstruction, the device has to be placed on a flat surface, leaving some space at the sides of the device.
- When in operation, the internal temperature should not exceed the limit of 70 ℃.

2. Models that Are Covered by This User Manual

Function \ Model No.	Maximum CI 30xx							
	10S	11T	12C	13S2	40S	41T	42C	43S2
TSoIP					■	■	■	■
DVB-S Input	■				■			
DVB-T Input		■				■		
DVB-C Input			■				■	
DVB-S2 Input				■				■
PCMCIA Slot *2	■							
ASI Input/Output	■							
SDI Output (audio embedded)	■							
Ethernet Remote Control	■							
CVBS Video Output	■							
A/V Output RCA *1	■							
Balance XRL Audio Output	■							
Simulcrypt Compliant	■							

Where the '■' sign represents standard option.

Table 2.1 *Model list of Maximum CI 30xx series*

3. Installation

3.1 Inspection

Open the packaging box. Check if all appendixes are in the box according to the appendix list, and if the device has any visible damage. Check that the power cord is suitable for the country where the device will be used. Please contact the agent if there is any damage or appendix missing.

3.2 Operating Voltage

Do not connect AC power until you have verified that the line voltage is correct and the proper fuses are installed. The power supply of the device is fitted with a wide-range power supply. It is suitable for supply voltages of 100-240 Vac -10% +6% at 50/60 Hz nominal. Please make sure the supply voltage is within the specified range.

POWER REQUIREMENT	
Input voltage	90-250 Vrms auto select
Frequency	47 to 63 Hz
Power	50 VA max. / 30 VA typical.
Current	110 V/0.27A or 240 V/0.125A typical

Table 3.1 *Power Requirement of Maximum CI 30xx Series*

3.3 Power Supply

The power cord is inserted to an IEC main socket, which is located at the side of the device.

A standard power cord with a European DIN 49441 two pin main plug is delivered along with the device.

3.4 The Fuses

The line fuse is housed in a small container beside the power connector on the rear panel. To check the fuse, insert the tip of a screwdriver in the slot at the middle of the container and pry gently to extend the fuse where there is a little tap. Then, pull out the fuse gently. The fuse should be attached to the line module and cannot be removed.

The recognized recommended fuses are size 5 by 20 mm, rate T 2.0A, 250 V (UL and IEC approved).

3.5 Connecting the Device

Always use the specified cables supplied for signal integrity and compliance with EMC requirements.

The rear panel is directly related to the input and output options fitted. The figure below shows a typical rear panel.

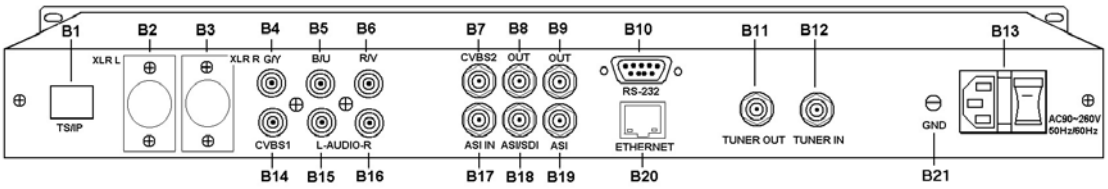


Figure 3.2 *Rear Panel of Maximum CI 30xx Series*

B1	TSoIP interface (not available on Maximum CI 301x)
B2	XRL L interface
B3	XRL R interface
B4	RGB/YUV interface (G/Y)
B5	RGB/YUV interface (B/U)
B6	RGB/YUV interface (R/Y)
B7	CVBS2 Output interface
B8, B18	ASI2/SDI output interface. 75 ohm female BNC connector.
B9, B19	ASI1 output interface. 75 ohm female BNC connector.
B17	ASI input interface. 75 ohm female BNC connector.

B10	RS-232 interface
B11	Tuner Loop Out interface
B12	Tuner In interface
B13	Power socket, AC 90~260V
B14	CVBS1 Output interface
B15, B16	L-Audio-R interface
B20	Ethernet interface for remote management system
B21	Grounding

Note:

This RS-232 interface is a 9-pins female sub-D connector that is only used for factory software upgrade and configuration. You may not connect any cable to the RS-232 connector, as that could cause damage to the device.

3.6 Power-on the Device

Make sure the device is mounted into the rack properly and firmly, and the signal cables are well connected before applying power to the device. The main socket and fuse are located at the rear panel of the device.

After the device is powered on, check if the following message presents on the display on the front panel:

Maximum CI 30xx (factory default unit-name)
IP: 10.10.60.148 (factory default IP Address for LAN access)

If no message is presented or there is no light on the display, the device is defective and has to be returned for servicing.

4. Navigating the Front Panel

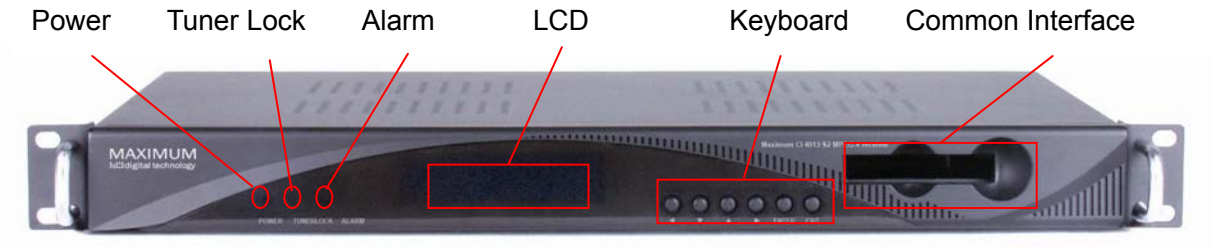


Figure 4.1 *Front Panel of Maximum CI 30xx Series*

4.1 Indicator LEDs

There are 3 LED-indicators:

-POWER: the status of the power supply

green: the power is turned on

off : the power is turned off

-TUNER LOCK: the status of the tuner

green: the incoming QPSK is locked by the tuner.

off : there is no QPSK input signal or the signal is unlocked

-ALARM: the status of input signal source, which includes IP input, QPSK signal input and DVB-ASI TS input.

4.2 LCD

The 2 x 20 character Liquid Crystal Display (LCD) shows all the required information about the selected parameters.

The top row of the LCD shows the selected parameter. The bottom row indicates the present values and how these can be adjusted.

The parameters are grouped in three menus:

-the **Inputs**, which provides the full operation on inputs parameters
-the **Outputs**, which provides the full operation control functions on outputs parameters
-the **Systems**, which provides the general device management parameters and informs the device working status

When the label '**->**' is shown in the right side on the second row, it indicates you can use **<ENTER>-key** for further navigation in sub-menus.

4.3 Operation Buttons

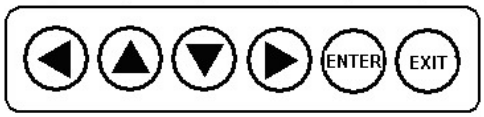


Figure 4.2 *Keypad of Maximum CI 30xx series*

The 6 keys on the front panel allow you to navigate the information provided on the LCD and change parameters when the device operates under local control.

The **<ENTER>-key** is used to enter the main menu or a sub-menu. When you are at the preferred menu, **<ENTER>** is used to active the parameter on the bottom line and allows you to change the value. It also finishes the input of new alphanumeric values and confirms the changes.

The **<▲>-and<▼>-keys** are used to select between the main menus, sub-menus or programs. When you are at the preferred menu and the parameter is activated, they are also used to change the numerical values. You may selection the digit using the **<◀>-and <▶>-keys**.

The **<EXIT>-key** is used to exit a menu without any action taking place.

4.4 Common Interface

There are two Common Interface slots. You can insert up to two different CAM modules for descrambling.

5. Function Block Diagram

The chart below shows the complete function block diagram of Maximum CI 30xx. The arrow '→' or 'dotted arrow' indicates the transport stream flow. The function blocks embayed in the dotted line are user-configurable.

The TS/IP function block is valid when the TS/IP streaming board is installed into the Maximum CI 30xx. You can set it as 'IP In' or 'IP Out', which is exclusive to each other (refer to section 6.4.6).

The Mux/Filter function block is standard option and could be configured as internal 2-way 'multiplexer' or 'filter', which is exclusive to each other. Also you can turn on or off the block (refer to section 6.4.6).

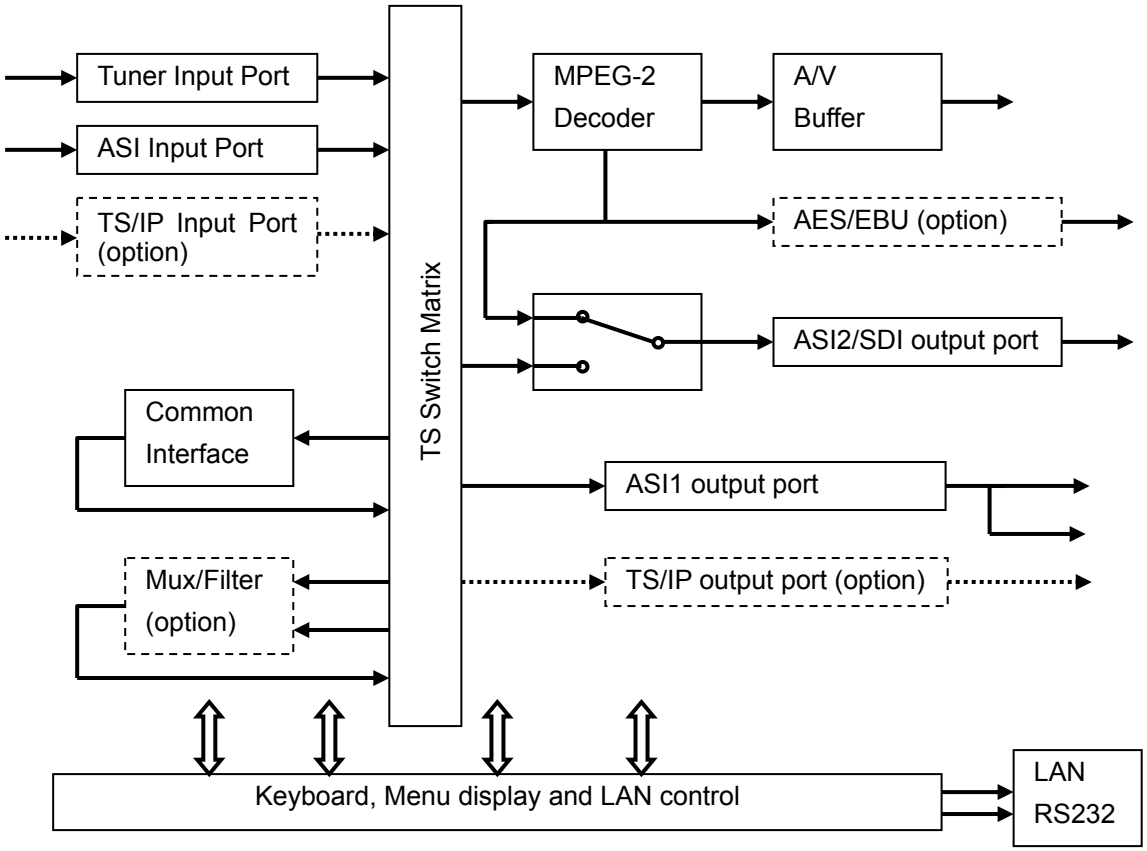


Figure 5.1 *Maximum CI 30xx Function Block*

6. Start to Use

The device allows you to configure, control and monitor through the Keypad and front panel display when a remote control system is not used.

6.1 Main Menu

Turn on the device and wait for 8 to 10 seconds. During this period, the device will complete self inspection and configuration. The name of the device will be displayed on the top row of the LCD, and the local IP address will be displayed on the bottom row of the LCD.

Note: the local IP address and unit name can be changed in the System Menu (refer to section 6.4.1 and 6.4.3 System).

Use the **<ENTER>-key** to enter on the Main Menu. The **<▲>-and<▼>-keys** are used to choose between the three main menus.

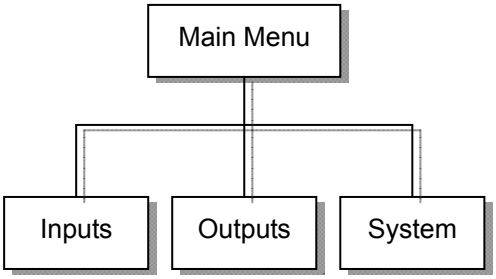


Figure 6.1 *Main Menu Structure*

6.2 Inputs

Under Inputs Menu, you can monitor and configure the parameters of the Tuner, and TS over IP input (only when the TS/IP streaming board is installed and the board is set to “IP In” (refer to section 6.4.6 Optional Function).

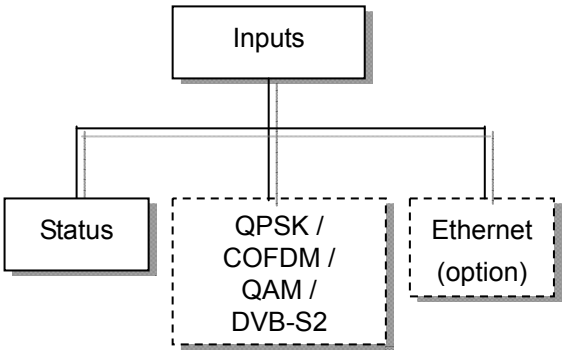


Figure 6.2 *Inputs Menu Structure*

6.2.1 Status

You can monitor the status of the inputs signals under the status menu.

- ASI Input: locked or unlock indicate the status of the ASI input.

- Tuner Input: when the QPSK/QAM/COFDM signal is locked by the tuner, the bit rate is displayed on the bottom row of LCD.

- **Ethernet:** this indicates the status of the transport stream over IP input. The bitrate is displayed on the bottom row of the LCD only if IP input is valid (note this menu is showed only when the TS/IP streaming board is installed and the board is set to "IP In", refer to section 6.4.6 Optional Function).

6.2.2 QPSK/COFDM/QAM/8PSK

The tuner setting menu is different and exclusive for different DVB-S/S2 /DVB-T/DVB-C tuner deployed. To receive the QPSK/COFDM/QAM/8PSK signal, the relative parameters below must be set to the appropriate values for the receiving antenna to receive the signal.

QPSK

- **LNB Local Oscillator (L.O.) Freq:** enter the frequency of the LNB in MHz.
- **Satellite Freq:** edit the satellite down link frequency in MHz. The IF frequency will be calculated automatically.
- **Symbol Rate:** enter the QPSK symbol rate.
- **LNB Voltage:** select the correct LNB voltage output of the F-connector: Off, 13 V, 18 V. <A>
- **LNB 22KHz:** activate the LNB 22 kHz control signal to the LNB: On or Off. <B>
- **DiSEQC:** User can select Port A, Port B, Port C, Port D or DiSEQC OFF

Note: please contact the local satellite operator for the satellite frequency and symbol rate.

<A> Normally, 13V switches the LNB to receive Vertical/Left hand polarization while 18V receive Horizontal/Right hand.

<B> Normally, 22KHz control signal switches the LNB to receive high band if any.

COFDM

- **Frequency:** enter the proper frequency of the COFDM signal in MHz.

QAM

- **Constellation:** enter the modulation mode of the QAM signal.
- **Frequency:** enter the frequency of the QAM signal in MHz.
- **Symbol Rate:** edit the symbol rate to the proper value in KBaud.

8PSK

- **LNB Local Oscillator (L.O.) Freq:** enter the frequency of LNB in MHz.
- **Satellite Freq:** edit the satellite down link frequency in MHz. The IF frequency will be calculated automatically.
- **Symbol Rate:** enter the QPSK/8PSK symbol rate.

- **LNB Voltage:** select the correct LNB voltage output of the F-connector: Off, 13 V, 18 V. <A>

- **LNB 22KHz:** activate the LNB 22 kHz control signal to the LNB: On or Off. <B>

Note: please contact the local satellite operator for the satellite frequency and symbol rate.

<A> Normally, 13V switches the LNB to receive Vertical/Left hand polarization while 18V receive Horizontal/Right hand.

<B> Normally, 22KHz control signal switches the LNB to receive high band if any.

- **Demodulation Mode:** select the DVB-S or DVB-S2 demodulation mode.

- **Operation Mode:** select the appropriate operation mode in the menu. There are QPSK 1/2, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 and 8PSK 2/3, 3/4, 3/5, 5/6, 8/9, 9/10 to choose among.

- **Pilot:** select Off or On according to the actual signal.

- **Roll-Off Factor:** you can choose 0.2, 0.25 or 0.35.

6.2.3 RSSI

There are four options to show the quality of receiving DVB-S signal.

6.2.4 Ethernet

(Note: this menu is showed only when the TS/IP streaming board is installed and the board is set to “IP In”. Please refer to section 6.4.6 Optional Function.)

The Ethernet connector is for receiving transport stream over IP. The Ethernet connector has user-configurable IP address, network mask and default gateway. These must be set to the appropriate values for the network to work properly.

- **Stream IP Addr:** Enter the IP address for streaming IP input of the unit.

- **Stream Network**: Enter the network sub mask for the subnet to which the unit is connected for IP streaming traffic.

- **Stream Gateway:** Set the gateway for the network to which the unit is connected for IP streaming traffic.

- **Stream Mac Address:** factory-set MAC addresses are guaranteed to be unique. Therefore, you cannot configure the address.

- **Multicast IP Addr:** Enter the IP address of the multicast stream for the transport stream over IP.

- **Multicast UDP Port:** Enter the UDP port number of the TS over IP stream.

- **Protocol:** select the protocol for multicast: UDP or RTP.

- **Output Smoothing:** set the quality of TS which comes from the TS/IP input.

Auto: the bit rate is variable.
Disable: the unit let the TS pass by.
Fixed Rate: the bitrate is fixed.

- TS Bit Rate: set the bit rate of the TS comes from the TS/IP input. The setting is only valid when the output smoothing is configured as Fixed Rate.

6.3 Outputs

Under Outputs Menu, you can monitor and configure the parameters of CI, AV decoder, ASI out, ASI2/SDI out, Mux/Filter (A), and TS over IP output (B).

(A) The Mux/Filter menu is showed only if the functional block is enabled. Refer to section 6.4.6.

(B) The menu is showed only if the IP streaming in/out board is installed and the TS/IP streaming board is set to “IP Out”. Refer to section 6.4.6.

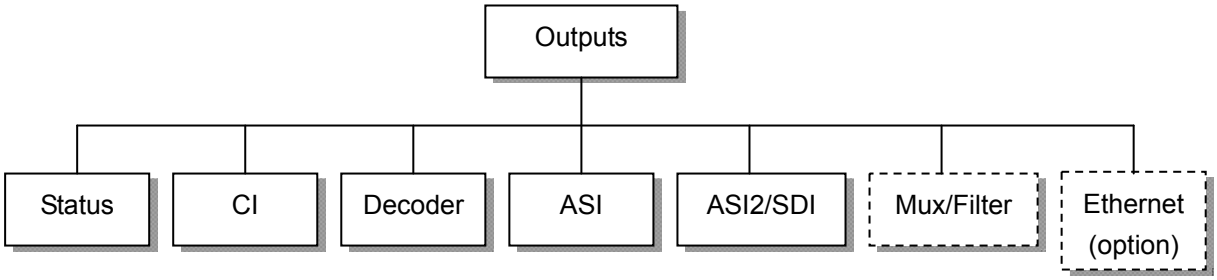


Figure 6.3 *Outputs Menu Structure*

6.3.1 Status

There are 3 displays on the LCD for monitoring the status of the decoder, the common interface.

- Decoder: OK or Alarms indicates the status of the decoder. You can use the **<ENTER>-key** to check detailed information in the submenu of the Decoder.

- CI: You can check the information of the CAM Modules in Slot1 and Slot2.

6.3.2 CI

There are two PCMCIA slots for inserting CAM for de-encrypting program from the input signal.

Before setting CI, make sure the signal from ASI input is locked or the Tuner locks is on the correct Transponder (this depends on which signal the encrypted program carries). The ‘Tuner Lock’ green LED should be ‘on' when CAM is inserted.

There are 2 submenus: ‘CI Source’ and ‘Setup’, which allow you to set or select the parameters of the CI.

- CI Source: press the **<ENTER>-key**, then use **<▲> or <▼>-key** to select Tuner, ASI input or TS/IP input (the TS/IP option is only available when the “IP In” is set. Refer to section 6.4.6 for details). When done choosing, press **<ENTER>-key** to confirm and save or press **<EXIT>-key** to discard and exit.

- Setup: under this sub menu, you can see all program names from the CI source that was set in '**CI Source**' previously. All free programs are marked with '**Free**' in the first row.

To select which program to be de-encrypted, press the **<▲> or <▼>-key** to roll up and down the program names and press **<ENTER>-key** to change the status of the corresponding program (only encrypted program could be selected). Three different statuses could be set:

Slot 1 (de-encrypted with upper CAM inserted)

Slot 2 (de-encrypted with lower CAM inserted)

Bypass (no de-encryption).

The status will be shown in the first row on the LCD display. Confirm this setup when leaving this sub menu. Press **<ENTER>-key** to confirm and save or press **<EXIT>-key** to discard and exit.

The de-encrypted program could be delivered to other functional blocks such as A/V decoder, ASI, ASI2/SDI, Mux/Filter and TS/IP output (refer to section 6.3.3~6.3.6 for more).

6.3.3 Decoder

You can configure the parameters of Video and Audio of the program decoded by AV decoder.

- Program: under this sub menu, you will see all program names detected by 4000P. The programs could be coming from ASI input, Tuner, TS/IP input or the internal CI de-encryption block. Use the **<▲> or <▼>-key** to roll up or down between the program names, and use **<◀>-and <▶>-key** to switch among input sources. The character in front of the program name indicates the input source. For example:

A-xxxxx: the program comes from the ASI input.

T-xxxxx: the program comes from the TUNER input.

I –xxxxx: the program comes from the TS/IP input

C-xxxxx: the program comes from the internal CI functional block.

(**xxxxx** is the program name)

A few seconds after the program being selected, the A/V signal will be delivered to the related connectors on the back panel.

- Video: You can configure the video parameters of programs in this submenu. Press the **<ENTER>-key** to confirm and press the **<EXIT>-key** to cancel.

Video Standard: you can select Auto or SECAM or NTSC or PAL for the composite video output.

Screen: select the screen mode: Auto, 4:3 Full, 16:9 Full or 4:3 Letterbox.

DVB Subtitle Lang: select the language of DVB Subtitle.

EBU Subtitle Lang: select the language of EBU Subtitle.

Subtitle Priority: configure the priority of Subtitle; choose whether DVB or EBU should be first.

Close Caption： Select 'OFF' will turn off the caption and select 'ON' will turn on the caption.

VBI Mode： Select 'DISABLE' will disable the VBI mode and select 'ENABLE' will enable the VBI mode.

- Audio: You can configure the audio settings in the submenu.

Audio Level: use the **<▲> <▼> <◀> <▶>-keys** to modify the audio level within this range: 0~99.

Audio Mode: select Stereo, Left, Right or Mono for soundtracks.

Audio Language: select the language of the audio.

- Biss： It includes Biss Mode, Biss 1 Setup and Biss E Setup

Biss Mode：Set Biss mode, can select 'OFF', 'Biss E' or 'Biss 1'

Biss 1 Setup：set Biss 1 (password is required)

Biss E Setup：set Biss E (ID number and password are required)

6.3.4 ASI

You can configure the settings of ASI in this menu.

- ASI Source: Press the **<ENTER>-key** and use the **<▲> or <▼>-key** to roll up or down to select the signal source of ASI output. There are 4 type of signal source optional:

CI De-encrypted: the de-encrypted transport stream from CI functional block will be delivered to the ASI output port on the back panel.
TUNER: the transport stream from Tuner block will be delivered to the ASI output port on the back panel.
ASI Input: the transport stream comes from ASI input port will be delivered to the ASI output port on the back panel.
Mux TS: the transport stream comes from internal Mux / Filter functional block will be delivered to the ASI output port on the back panel.

(The Mux TS is valid only when the Mux/Filter function block is enabled and turned on. The Mux TS indicates not only the after-multiplexed TS when Mux is enabled, but also the after-filtered TS when the filter is enabled. Refer to section 6.3.6 and section 6.4.6 for how to set the Mux / Filter function block.)

Press **<ENTER>-key** to save or press **<EXIT>-key** to discard. A few seconds after the source is selected, the TS will be delivered to the ASI output port on the back panel.

- ASI Package Length: you can configure the package length of ASI output as 188 bytes or select Bypass.

6.3.5 ASI2/SDI

You can choose between ASI output and SDI output.

If the port is configured as ASI2, the configuration method is the same as ASI (refer to section 6.3.4).

If the port is configured as SDI, there are two parameters which need to be set: 'Audio PID' and 'Embed Audios'.

- Audio PID: press the **<▲> <▼>-keys** to choose the audio PID from 1~4.

- Embed Audios: there are 4 options: none, one&two, two, and one.

6.3.6 Mux / Filter

The Mux or Filter menu is shown only when the Mux/Filter function block is enabled and turned on. The Mux / Filter are alternative (refer to section 6.4.6 for how to turn on and set the Mux / Filter function block).

Make sure the s/w supports Mux / Filter function. The earlier s/w has masked the Mux / Filter function. After s/w: 03.9a.xx, this Mux / Filter function has been unmasked.

Mux function description

Mux Switch: the internal multiplexer could be switched On/Off. The default value is 'off'. To activate the re-Multiplexing function, you should turn on the Mux functional block.

Bit Rate: should be set to a specified value that doesn't exceed the Maximum physical limit of the output medium. For example, to deliver the multiplexed TS to an 8MHz DVB 256QAM modulator, it should not exceed 55000Kb/s, otherwise overflow occurs.

TS ID: you can configure the TS ID to mark the multiplexed TS. The default value is 1.

Program List: press the **<ENTER>-key** to enter '**Mux List**' sub-menu. It shows all programs detected by Maximum CI 30xx. The programs could be come from ASI input, Tuner, TS/IP input or the internal CI de-encryption block. Use **<▲> <▼>-keys** to roll up the program names, and use **<◀> <▶>-keys** to switch among input sources, where the character in front of the program name indicates the input source:

A-xxxxx: the program comes from the ASI input.

T-xxxxx: the program comes from the TUNER input.

I –xxxxx: the program comes from the TS/IP input

C-xxxxx: the program comes from the internal CI function block.

(**xxxxx** is the program name)

On '**Mux List**' sub-menu, which is on the first row, all encrypted programs are labeled with a '**$**' sign. All programs being selected to be re-multiplexed are labeled as '**Pass**', otherwise, the un-selected programs are labeled as '**Fobrid**'. Use **<ENTER>-key** to selected or un-selected the program being shown.

When leaving the '**Mux List**' sub-menu, a new menu will be shown '**Confirm changed?**' Press the **<ENTER>-key** to validate all programs just be selected to be multiplexed or press the **<EXIT>-key** to discard the settings.

After a few seconds, the multiplexed TS will be generated and delivered to the specified destination(s).

Filter function description

Filter Switch: the internal filter could be switched On/Off. The default value is 'off'. To activate the filter function, you should turn on this filter functional block.

Bit Rate: should be set to a specified value that does not exceed the Maximum physical limit of the output medium, otherwise overflow occurs.

Source: Press the **<ENTER>-key** and use the **<▲> or <▼>-key** to roll up or down to select the signal source of filter function block, there are 4 type of signal source optional:

CI De-encrypted
TUNER
ASI Input
TS/IP input (only available when the TS/IP is set "IP In". Refer to section 7.4.6 for details)

Use **<ENTER>-key** to save or press **<EXIT>-key** to discard.

Program List: Press the **<ENTER>-key** to enter '**Filter List**' sub-menu. It shows all programs carried by the signal come from the selected source in previous step. The programs could be come from ASI input, Tuner, TS/IP input or the internal CI de-encryption block. Use **<▲> <▼>-keys** to roll up the program names, where the character in front of the program name indicates the input source:

A-xxxxx: the program comes from the ASI input.

T-xxxxx: the program comes from the TUNER input.

I –xxxxx: the program comes from the TS/IP input

C-xxxxx: the program comes from the internal CI function block.

(**xxxxx** is the program name)

On '**Filter List**' sub-menu, all programs that are being selected to be filtered away are labeled as '**Forbid**', otherwise, the un-selected programs are labeled as '**Pass**'. Use the **<ENTER>-key** to selected or un-selected the program being shown.

When exiting the '**Filter List**' sub-menu, a new menu will be shown '**Confirm changed?**' Press the **<ENTER>-key** to validate all programs just be selected to be filtered away or press the **<EXIT>-key** to discard the settings.

After a few seconds, the filtered TS will be generated and delivered to the specified destination(s).

6.3.7 Ethernet

(Note: This menu is shown only when the TS/IP streaming is installed and the board is set to "IP Out". Refer to section 6.4.6 for more details.)

The TS/IP Ethernet connector could also be configured as the output of the transport stream over IP. The parameters listed below must be set to appropriate values for the network that the transport stream over IP is broadcasted.

- **Stream IP Addr:** Enter the IP address for streaming IP output of the unit.

- **Stream Netmask**: Enter the network sub mask for the subnet to which the unit is connected for IP streaming traffic.

- **Stream Gateway:** Set the gateway for the network to which the unit is connected for IP streaming traffic.

- **Stream Mac Address:** factory-set MAC addresses are guaranteed to be unique. Therefore, you cannot configure the address.

- **Protocol:** select the protocol for multicast: UDP or RTP.

- **TS Pkts per UDP:** set the number of the TS packages encapsulated in one UDP package. The valid range goes from 1 to 7.

- **Time to Live:** set the number of the routers over which the TS over IP can be transmitted. The valid range goes from 1 to 5.

- **Type of Service:** select the type of service. There are: Normal, Min Monetary Cost, Max Reliability, Max Throughput or Min Delay optional.

- **Source:** select the source of the transport stream over IP streaming output. There are 4 type of source optional:

  ASI Input
  CI De-encrypted
  TUNER
  Mux TS (note the Mux TS is showed only when the Mux/Filter function block is enabled and turned on. The Mux TS indicates not only the after-multiplexed TS when Mux is enabled, but also the after-filtered TS when the filter is enabled. Refer

to section 6.3.6 and section 6.4.6 for how to set the Mux / Filter function block)

After the operation, the selected transport stream will be delivered to the TS / IP function block for further operation.

- Mode: select the mode of IP stream, you can select DVB or IPTV.

DVB mode: the transport stream which comes from the 'source' selected in the previous step will be packed into IP Stream directly. The IP stream will carry all programs, and this IP stream will be delivered to specified Multicast or Unicast IP address.

IPTV mode: the transport stream which comes from the 'source' selected in the previous step will be de-Muxed to several single programs, and each program is packed into one IP stream. Each IP stream is then being delivered to specified Multicast or Unicast IP address. You can configure up to 6 IPTV channels.

- Multicast Setup: use the **<ENTER>-key** to enter sub-menu. The sub-menu is different according to different 'mode' selected in previous step.

DVB mode

- Multicast IP: Enter the IP address of the IP stream for the transport stream over IP output. You can configure the IP stream output mode in Multicast or Unicast.

Multicast could be established by setting Multicast IP address in the range between 239.255.255.255 and 224.0.0.0.

Unicast could be established with the same settings of Multicast, but there is a difference. The IP address should NOT be set in the range between 224.0.0.0 and 239.255.255.255. Although the display is 'Multicast IP' on the first row, the stream itself is Unicast. The IP address of the receiving device (may be PC with VLC) needed to be set to the same unicast address as the one on Maximum CI 30xx. Please don't use DHCP to get a dynamic IP address for the receiving device.

- Multicast UDP Port: Enter the UDP port number of the TS over IP stream output.

IPTV mode

- Max Channels (<=6): you can configure the number of IPTV channel. The valid range goes from 0 to 6.

After the configuration, you can use **<▲> <▼>-keys** to roll up and down between the channels. Each channel could be configured independently.

- **Channel x:** '**x**' means the channel number. Press the **<ENTER>-key** to go down to the sub-menu. There are 4 sub-menus:

x-Multicast IP: Enter the IP address of the IP stream for the transport stream over IP output.

You can also configure the IP stream output mode in Multicast or Unicast by setting Multicast IP address.

x-Multicast Port: Enter the UDP port number of the TS over IP stream output.

x-Switch: each channel could be switched On/Off independently. The default value is 'off'. To activate the channel, you need to set the switch to be 'on'.

x-Program: it shows all programs carried by the transport stream from the source selected. Press the **<ENTER>-key** and use **<▲> <▼>-keys** to roll up and down between the program names, where the character in front of the program name indicates the input source:

A-xxxxx: the program comes from the ASI input.

T-xxxxx: the program comes from the TUNER input.

I –xxxxx: the program comes from the TS/IP input

C-xxxxx: the program comes from the internal CI function block.

(**xxxxx** is the program name)

All encrypted programs are labeled with a '**$**' sign on the first row. Press the **<ENTER>-key** to selected the program you wish to be delivered to the specified IPTV channel. Press the **<EXIT>-key** to exit the settings.

6.4 System

The system menu provides information about the general functions, the surroundings equipment and the hardware being used.

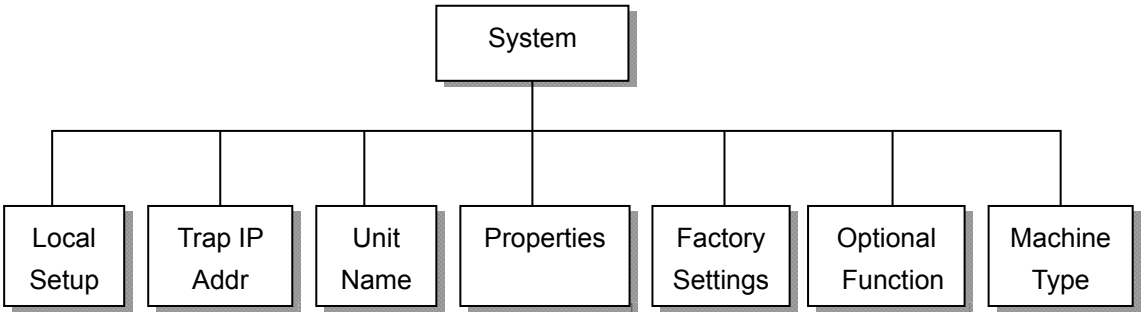


***Figure 6.4** System Menu*

6.4.1 Local Setup

Each Maximum CI 30xx has an IP address, a network sub mask and a gateway. These parameters must be set to appropriate values so that the unit can be accessed by the remote control system (for example: HDMS).

- IP Address: The IP address for the unit.

- Network Mask: The network mask for the subnet in which the unit is connected to.

- Gateway: The gateway for the network in which this unit is connected to.

6.4.2 Trap IP Addr

The Maximum CI 30xx provides a Monitor Center IP address. You can set this to be the same IP address of the Monitor Center, which is typically a PC in order to allow the device to send messages to the monitor center. If the Maximum CI 30xx is connected with the HDMS remote management system, the Trap IP address is typically set to be the IP address of the PC where the HDMS has been installed.

6.4.3 Unit Name

The Maximum CI 30xx allows you to edit the unit name which is displayed on the front panel LCD. The default name is 'Digital TV Processor". The unit name should not be longer than 20 characters in ASCII format.

6.4.4 Properties

You are allowed to check the properties information of the device.

- MAC address: Factory-set MAC address is guaranteed to be unique. You cannot configure this address.

- FW Version: the version of the FPGA software (note that this version number will be changed automatically according to the TS/IP settings ('IP In' or 'IP Out').

- SW Version: the version of the main software.

6.4.5 Factory Settings

All the user configurable parameters will be set to the factory default settings, including IP address and the unit name. Note the unit will not be connected with the HDMS remote management system until the IP is properly configured.

6.4.6 Optional Function

There are two submenus:

- External Board Type: Press the **<ENTER>-key** to activate the menu, and use the **<▲> <▼>-keys** to configure the TS/IP functional block to 'IP In', 'IP Out' or 'No Exist'. Press the **<ENTER>-key** to confirm and save or press the **<EXIT>-key** to discard and exit.

After the operation is complete, you need reboot the unit to valid the configuration.

IP In: the TS/IP port is configured as input. You can feed transport stream over IP into the unit. The menu 'Ethernet' will be shown under the inputs menu.

IP Out: the TS/IP port is configured as output. You can set the transport stream over IP output to the IP network. The menu 'Ethernet' will be shown under the outputs menu.

No Exist: the TS/IP port is invalid. Therefore, the menu 'Ethernet' will not be shown anywhere.

- Filter Function: Press the **<ENTER>-key** to activate the menu, and use the **<▲> <▼>-keys** to configure the TS/IP functional block to 'IP In', 'IP Out' or 'No Exist'. Press the **<ENTER>-key** to confirm and save or press the **<EXIT>-key** to discard and exit.

6.4.7 Setting Machine Type

This setting is reserved for factory-setting only.

7. Remote Monitoring and Control

The Maximum CI 30xx series provides an Ethernet remote control interface for user remote control or supervise on one or multiple Maximum CI 30xx via the Headend Devices Management System (HDMS).

7.1 Install HDMS to a PC

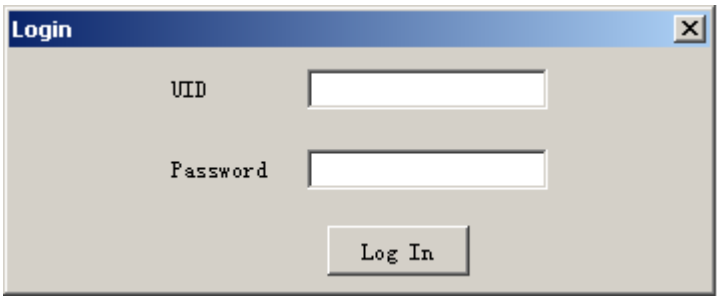
The HDMS Installation.exe file could be found on the CD-ROM which is enclosed in the original package. Detail information about installation can be found in the *HDMS Reference Guide*.

7.2 Connect to HDMS

After installation of HDMS, you need to configure the local settings of the Maximum CI 30xx (s) which is/are expected to be connect to the remote control network. Please refer to section 6.4.1.

7.3 Login to HDMS

To login on HDMS, a user account and password are needed. Default user account is: hdms, password is: hdms. You can create or delete new accounts. Detailed information can be found in the *HDMS Reference Guide.*



7.4 Add Maximum CI 30xx to HMDS

Make sure the Maximum CI 30xx are well connected with the network which the PC with HDMS installed can access the Maximum CI 30xx. Press the icon in the top left of the window in HDMS and the system will start searching the Maximum CI 30xx automatically. The device found will be displayed in the Devices Window in HDMS.

When a new Maximum CI 30xx is added to the remote control network, you can press to refresh the network. The new added unit will be added into the HDMS automatically. For other methods for adding one or a group of Maximum CI 30xx, please refer to the *HDMS Reference Guide.*

7.5 Maximum CI 30xx in HDMS

Double click on the device in the Devices Management window to open the console of the Maximum CI 30xx. The HDMS provides full operation to the Maximum CI 30xx. Parameters are grouped in three panels:

- The Input Setting, provides the full operation on inputs parameters.

- The Output Setting, allows the full operation control functions on outputs parameters.

- The System Setting, shows the general device management parameters.

Each console has four control buttons:

- Apply: to apply the current settings for the unit which is being accessed.

- Refresh: to obtain the current settings from the unit.

- Load: to load the pre-settings files to the HDMS, and press “Apply” to apply the pre-settings for the unit.

- Save: save the user’s settings as an .xml file.

Remark: When duplicating the configuration of one device to the other unit(s), you need to modify the System Setting (such as IP address, gateway, Unit name, etc) manually after loading the .xml file.

7.6 Other Settings

The HDMS provides Alarms management, Devices management, and User accounts management. It may also be necessary to modify some of the other settings to suit the particular installation. Please refer to the *HDMS Reference Guide* for more information.

8. FAQ

1. Why there is nothing shown on the LCD?

Answer: Please check whether the power supply is well connected first. If not, please reconnect it and turn on the device. If there is still nothing displayed on the LCD, the unit may be damaged. Please contact a service agent for technical supports.

2. Why can't the QPSK/QAM/COFDM/DVB-S2 signal be locked?

Answer: Please double check whether the input cable is well connected first. If not, please reconnect it. If it is connected well, please check whether all the necessary parameters are set properly. If not, please set the parameters properly. If the signal still cannot be locked, please check whether the quality of the signal is out of the threshold of the Tuner. If none of the above solutions resolves the problem, the device might be damaged. Please contact a service agent for supports.

3. Why can't the ASI be locked?

Answer: Please make sure the BNC cable is well connected and there are programs transmitted to the unit via the BNC cable. If the problem remains unresolved, please contact a service agent for supports.

4. Why can the Maximum CI 30xx not be connected to HDMS?

Answer: Please double check whether the Ethernet cable is well connected first. Also, make sure the parameters are set appropriately under "Local Setup", and the HDSM software is installed correctly in PC (which should also be set appropriately and can access the network Maximum CI 30xx is connected to). If the problem remains unresolved, please contact a service agent for supports.

9 Specification

QPSK Demodulation & FEC Parameters	
Input Frequency Range	C & Ku Band, 950~2150 MHz
Input Level	-25 dBm ~ -65 dBm
Input Impedance	75 Ω F type
Symbol Rate	2~45 Mb/s (SCPC or MCPC)

Rolling Off Factory	0.20 or 0.35
Punctured Rates	1/2, 2/3, 3/4, 5/6, 6/7, 7/8
Reeds Salomon Decoding	204, 188, T = 8 & I=12
DVB-C QAM Demodulation	
Connector	IEC, Female (7/8 MHz) or F Female (6 MHz) Input
Input Symbol Rate Range	1~7 Mbs (PAL), 1~6 Mbps (NTSC)
Demodulation	16/32/64/128/256 QAM
Tuner Bandwidth	6 MHz or 7 MHz or 8 MHz factory optional
FEC Decoder	1/2, 2/3, 3/4, 5/6, 7/8; K=7
Frequency Range	50~860 MHz
Digital Signal Input Level	-15~15 dBmV
Input Impedance	75 Ω F-type
DVB-T COFDM Demodulation	
Connector	IEC, Female (7/8 MHz) or F Female (6 MHz) Input
1 IF Loop through	Yes
Frequency Range	470-862 MHz, 174-230 MHz
Input Symbol Rate Range	4.98~31.67 Mbit/s (8 MHz bandwidth)
Constellation	QPSK, 16-QAM, 64-QAM
Tuner Bandwidth	8 MHz
Digital Signal Input Level	-20 to -75 dBmV
Input Impedance	75 Ω unbalanced
FFT mode	2K/8K
Guard Interval	1/4, 1/8, 1/16, 1/32, off
FEC Code Rate	1/2, 2/3, 3/4, 5/6 and 7/8
DS3 Input	
Input Impedance	75 Ω
Connector	BNC
Maximum Input Code Rate	44.736 Mbit/s
Format	Unframed Framing according to G.804/G.752 (DS3)
DS3 Loop Through Output	
Impedance	75 Ω
Maximum Output Code Rate	44.736 Mbit/s
Connector	BNC
Format	Unframed Framing according to G.804/G.752 (DS3)
TS over IP Output	
Connector	100 base-T RJ45
Output Bit Rate	70 Mbits/s Max.
UDP/RTP	Multicast or Unicast
Multicast Control Protocol	IGMPV2

I/O Interface on back panel	
LNB I/O	1×Input, 1×loop through output
RS-232	1×9-pin D-sub male
RJ45	1×Ethernet control port, 1×TS over IP output (factory optional)
ASI input	1
ASI output	2×Redundant output
SDI output	1 (optional)
RGB output	1×RCA
CVBS output	1×RCA, 1×BNC
Audio XRL Balance Output	1
General	
Operating Temperature	0-45 ℃
Storage Temperature	-20~70 ℃
Humidity	<85%
Power Supply	AC 90V~260V 50Hz/60Hz
Dimensions	483 mm×255 mm×44 mm
Approximate Net Weight	4.2 kg

10 Accessory List

Maximum CI 30xx	1set
CD	1pc
Power Cord	1pc
RCA A/V Cable	1pc
BNC Cable	1pc
XLR Connector	2pcs

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